Figure 1
SEQ ID NO:1

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TCCACCAGGCCCCTCGCCTGGGTACCATCGAGAAATGCCCGCCTTTGTGTCCAAGTGACA
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GGAAGAGCTGGAGCGACTGATTCCCATGGAACACGTGCAGCTGCCAGACTGTGTCCTGCA
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Figure 2
SEQ ID NO:2

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TAKNMPGDSADLFGDGSAEDGSAANGRLWRTVIIGEQEHRIDLHMIRPYM
KVVTHGGYYGEGLNAIIVFAACFLPDSSSPDYHYIMENLFLYVISSLELL
VAEDYMIVYLNGATPRRRMPGIGWLKKCYHMIDRRLRKNLKSLIIVHPSW
FIRTVLAISRPFISVKFISKIQYVHSLEELERLIPMEHVQLPDCVLQYEE
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Figure 3
SEQ ID NO:3

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121  cctgcacccc acccacccct gcacaaaaga gctggcgggc gctggccacg tcgccctggg
181  tgaccttcct cggatgcaga atccgccccc gcgagcatcc tcttcctcct aggctctgaa
241  ggcccgggga gcgtgagcga tgcccagctg cacccgggca gggctcgcct ttgtttgcca
301  gtaaggagga gaggctgtct cagctgcaga ggggtcatcc ctgcttcaag ccagtgcctc
361  ttcccagctc ccatggggac caccgaagcc acgctccgga tggaaaacgt ggacgtgaag
421  gaggaatggc aggacgaaga tcttcccagg ccactcccag aagagacggg ggtggaactg
481  cttggcagcc cggtggaaga cacatcctct cctcccaaca cgctaaattt caacggagcg
541  catcgtaaga ggaagacgct ggtggcccca gagatcaaca tttctctgga tcagagtgag
601  gggtccctgc tgtccgatga cttcttggat acccctgatg acctggatat taacgtggat
661  gacatcgaga cccccgatga gaccgactcg ctggagttcc tggggaatgg caacgaactg
721  gagtgggaag acgacacccc cgtggccacc gccaagaaca tgcccgggga cagcgcggat
781  ctatttgggg acggcacgac ggaggacggc agcgccgcca acgggcgcct gtggcggaca
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901  gtggtcaccc acggagggta ctacggcgaa ggcctcaacg ccatcatcgt cttcgcagcc
961  tgcttccttc cagacagcag cctccccgac taccactaca tcatggagaa cctcttcctg
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1141 atcgaccgga ggttgcggaa aaacctgaag tccttgatca tcgtccaccc ctcgtggttc
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1381 ccccagccgg agtttgtgct gcccaggtct gaagagaagc cagaggtggc accagtggaa
1441 aacaggtctg ctctggtctc agaagatcag gaaacaagca tgtcctgagg cgacgtgagc
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1561 gccccagatc tcatcctgcc tcatcctgag tcccaatctt ccaagggtgc cagcccctcc
1621 gttcatctct gaaacccagc atccttttca gctgcttgaa aacattgtat ttttttttt
1681 taacgatgca gtatttgtgc gttccagaaa agggcccagc tctgagcccc tcacccttcc
1741 acactcacga actctcagcc gaggaaggca agaagcgcag ggggtggccc gcgtggcgtc
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2641 cgcctgtaat cccagacttt gggaggccga ggcaggcgga tcacctgagg tgaggagttt
2701 gagaacagcc tggccaacat ggtgaaacct catctctact aaaaatacaa aaattagcca
2761 ggcgtggtgg caggtgcctg taatcccagc tacttgggag gctgaggcat gagaatcact
2821 taaacctgag aggcagaggt tacagtgagc caagatcgtg ccactgcatt ccagcctggg
2881 cgacagagca agactctgtc tcaaaaaaaa aaaaaaaa
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Figure 4
SEQ ID NO:4

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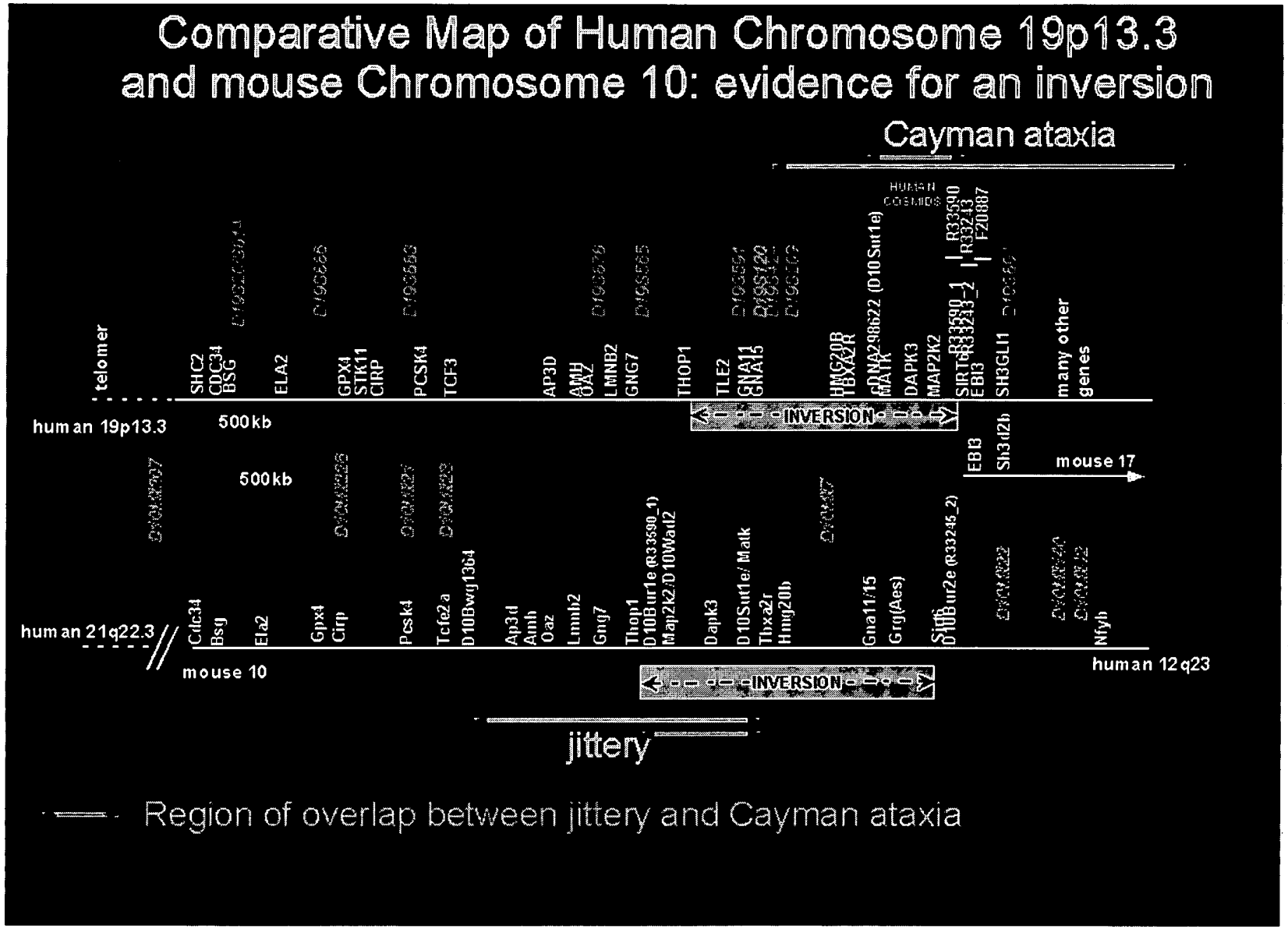
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Cayman ataxia
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SHC2
CDC34
BSG
ELA2
GPX4
STK11
CIRP
PCSK4
TCF3
AP3D
AMH
OAZ
LMNB2
GNG7
THOP1
TLE2
GNA11
GNA15
HMG20B
TBX2R
MAK
DAPK3
MAP2K2
SIRT6
EBI3
SH3GL1
many other genes
human 19p13.3
500kb
INVERSION
EBI3
Sh3d2b
mouse 17
500kb
Cdc34
Bsg
Ela2
Gpx4
Cirp
Pcsk4
Tcfe2a
D10Bwg1364
Ap3d1
Amh
Oaz
Lmnb2
Gng7
Thop1
D10Bur1e (R33590_1)
Map2k2/D10Wau12
Dapk3
D10Sut1e/ Mak
Thx2r
Hmg20b
Gna11/15
Grg1(Aes)
D10Bur2e (R33245_2)
Sirt6
Nfyb
human 21q22.3
mouse 10
human 12q23
INVERSION
jittery
Region of overlap between jittery and Cayman ataxia

Figure 5

Figure 6

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1 huKIAA1872 MGTTEATLRMENVDV KEEWQDEDLPRPLPE ETGVELLGSPVEDTS SPPNTLNFNGAHRKR KTLVAPEINISLDQS EGSLLSDDFLDTPDD
2 Macaque    MGTTEATLRMENVDV KEEWQDEDLPRPLPE ETGVELLGSPVEDTS SPPNTLNFNGAHRKR KTLVAPDINISLDQS EGSLLSDDFLDTPDD
3 mujittery  MGTTEATLRMENVDV RDEWQDEDLPRPLPE DTGVERLGGAVEDSS SPPSTLNLSGAHRKR KTLVAPEINISLDQS EGSLLSDDFLDTPDD
4 huBNIP2    ---------MEGVEL KEEWQDEDFPIPLPE DDSIEADILAITGPE DQPGSLEVN-GNKVR KKLMAPDISLTLDPS DGSVLSDDLDES---
5 muNIP2     ---------MEGVEL KEEWQDEDFPIPLPE DDSIEADILAITGPE DQPGSLEVN-GNKVR KKLMAPDISLTLDPS DGSVLSDDLDES---

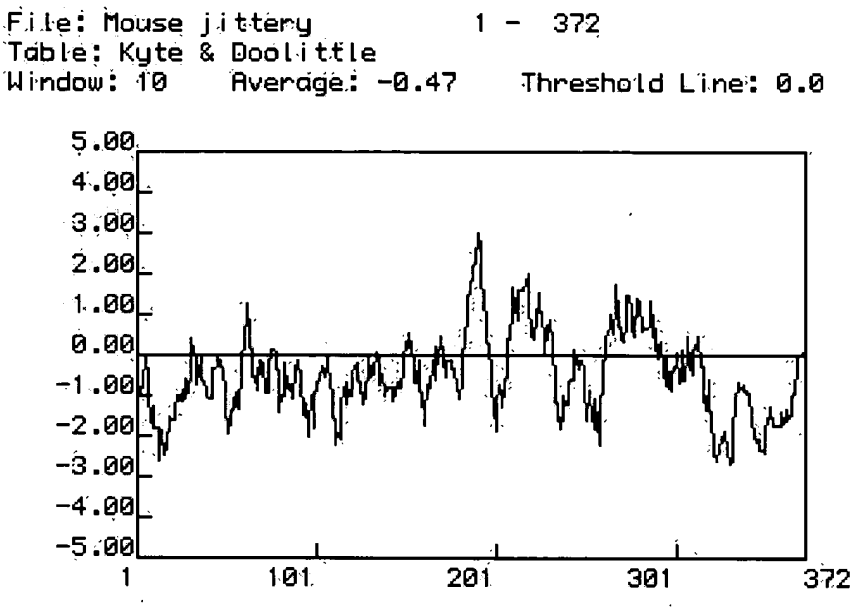
             91          105 106         120 121         135 136         150 151         165 166         180
1 huKIAA1872 LDINVDDIETPDETD SLEFLGNGNELEWED DTPVATAKNMPGDSA DLFGDGTTEDGSAAN GRLWRTVIIGEQEHR IDLHMIRPYMKVVTH
2 Macaque    LDINVDDIETPDETD SLEFLGNGNELEWGD DTPVATAKNMPGDSA DLFGDGTTEDGGAAN GRLWRTVIIGEQEHR IDLHMIRPYMKVVTH
3 mujittery  LDINVDDIETPDETD SLEFLGNGNELEWED DTPVATAKNMPGDSA DLFGDGSAEDGSAAN GRLWRTVIIGEQEHR IDLHMIRPYMKVVTH
4 huBNIP2    GEIDLDGLDTPSE-- ------NSNEFEWED DLPKPKTTEVIRKGS ITEYTAAEEK---ED GRRWRMFRIGEQDHR VDMKAIEPYKKVISH
5 muNIP2     GEIDLDGLDTPSE-- ------NSNEFEWED DLPKPKTTEVIRKGS ITEYTAAEEK---ED GRRWRMFRIGEQDHR VDMKAIEPYKKVISH

             181         195 196         210 211         225 226         240 241         255 256         270
1 huKIAA1872 GGYYGEGLNAIIVFA ACFLPDSSLPDYHYI MENLFLYVISSLELL VAEDYMIVYLNGATP RRRMPGIGWLKKCYQ MIDRRLRKNLKSLII
2 Macaque    GGYYGEGLNAIIVFA ACFLPDSSLPDYHYI MENLFLYVISSLELL VAEDYMIVYLNGATP RRRMPGIGWLKKCYQ MIDRRLRKNLKSLII
3 mujittery  GGYYGEGLNAIIVFA ACFLPDSSSPDYHYI MENLFLYVISSLKLL VAEDYMIVYLNGATP RRRMPGIGWLKKCYH MIDRRLRKNLKSLII
4 huBNIP2    GGYYGDGLNAIVVFA VCFMPESSQPNYRYL MDNLFKYVIGTLELL VAENYMIVYLNGATT RRKMPSLGWLRKCYQ QIDRRLRKNLKSLII
5 muNIP2     GGYYGDGLNAIVVFA VCFMPESSQPNYRYL MDNLFKYVIGTLELL VAENYMIVYLNGATT RRKMPSLGWLRKCYQ QIDRRLRKNLKSLII

             271         285 286         300 301         315 316         330 331         345 346         360
1 huKIAA1872 VHPSWFIRTVLAISR PFISVKFINKIQYVH SLEDLEQLIPMEHVQ IPDCVLQYEEERLKA RRESARP-QPEFVLP RSEEKPEVAPVENRS
2 Macaque    VHPSWFIRTVLAISR PFISVKFINKIQYVH SLEDLEQLIPMEHVQ IPDCVLQYEEERLKA RRESARP-QPEFVMP RSEEKPEVAPVENRS
3 mujittery  VHPSWFIRTVLAISR PFISVKFISKIQYVH SLEELERLIPMEHVQ LPDCVLQYEEQRLRA KRESTRPPQPEFLLP RSEEKPETVEEEDRA
4 huBNIP2    VHPSWFIRTLLAVTR PFISSKFSQKIRYVF NLAELAELVPMEYVG IPECIKQVDQELNGK QDEPKNEQ------- ---------------
5 muNIP2     VHPSWFIRTLLAVTR PFISSKFSQKIRYVF NLAELAELVPMEYVG IPECIKQVDQELNGK QDEPKNEQ------- ---------------

             361         375
1 huKIAA1872 ALVSEDQETSMS     371
2 Macaque    APVTEDQETSMS     371
3 mujittery  AEATEDQETSMS     372
4 huBNIP2    ------------     314
5 muNIP2     ------------     314
```

Figure 7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101
201
301
372

Figure 8
SEQ ID NO:8

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181  tgaccttcct cggatgcaga atccgccccc gcgagcatcc tcttcctcct aggctctgaa
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361  ttcccagctc ccatggggac caccgaagcc acgctccgga tggaaaacgt ggacgtgaag
421  gaggaatggc aggacgaaga tcttcccagg ccactcccag aagagacggg ggtggaactg
481  cttggcagcc cggtggaaga cacatcctct cctcccaaca cgctaaattt caacggagcg
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Figure 9
SEQ ID NO:9

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Figure 10
SEQ ID NO:10

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gaaaaaaaaa
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aaggggtgg
      781 tttatggttt aagacacaga tgcctcctcc ttattggaac tcgtatgtga
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Figure 11
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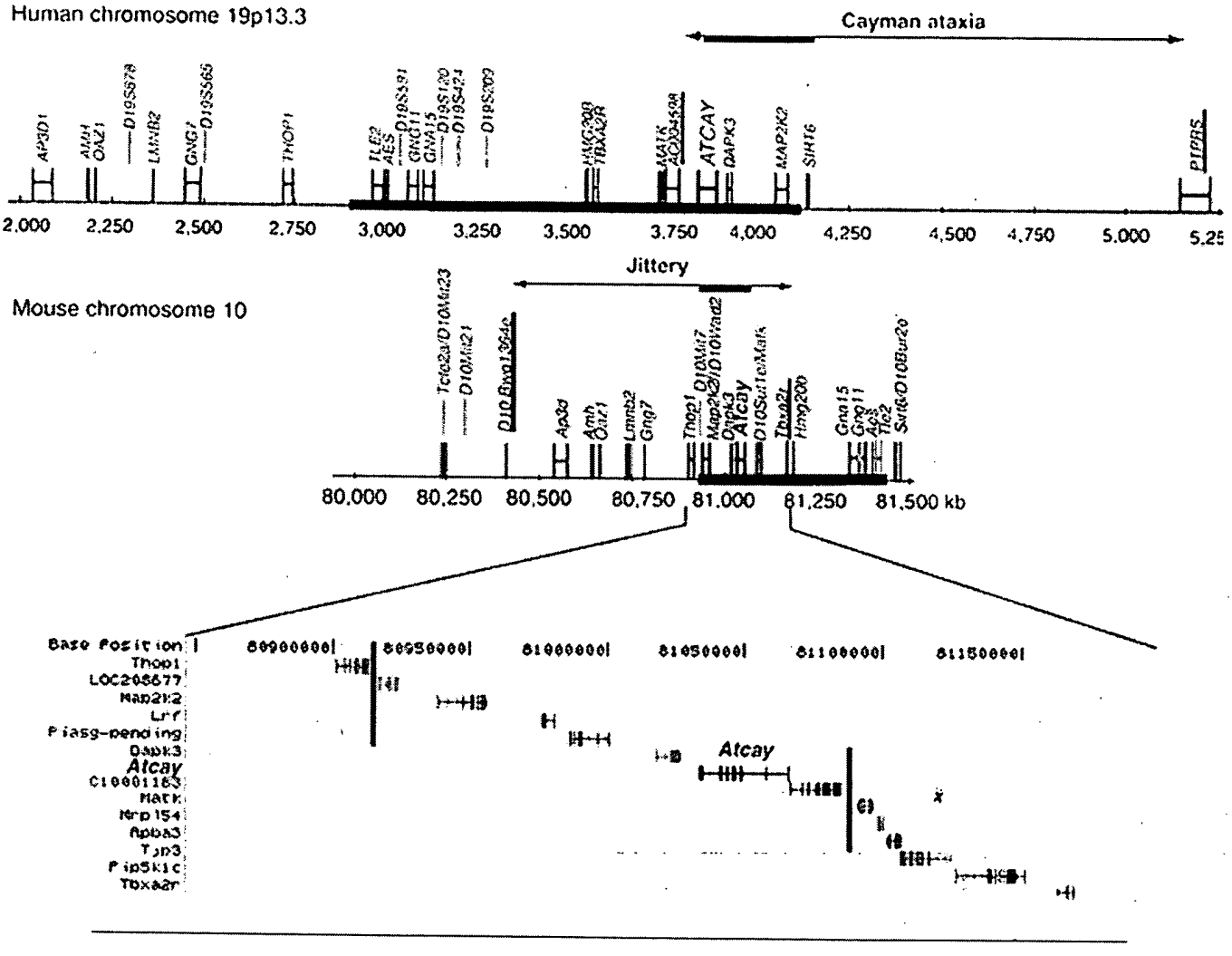
Figure 12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Cayman ataxia
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OAZ1
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AES
D19S391
GNG11
GNA15
D19S1120
D19S424
D19S209
HAK3P
TBXA2R
MAT1A
AQP4-AS1
ATCAY
DAPK3
MAP2K2
SIN1f6
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4,000
4,250
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5,000
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D10Mit21
D10Rp1364e
Ap3s
Amh
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Thop1
D10Mit7
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Dapk3
Atcay
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81100000
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Plasg-pending
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Matk
Mrp154
Apba3
Tyn3
PipSk1c
Tbxa2r

```
1 ATCAY       MGTTEATLRMENVDV KEEWQDEDLPRPLPE ETGVELLGSPVEDTS SPPNTLNFNGAHRKR KTLVAPEINISLDQ
2 ATCAY(Maca)MGTTEATLRMENVDV KEEWQDEDLPRPLPE ETGVELLGSPVEDTS SPPNTLNFNGAHRKR KTLVAPDINISLDQ
3 Atcay      MGTTEATLRMENVDV RDEWQDEDLPRPLPE DTGVERLGGAVEDSS SPPSTLNLSGAHRKR KTLVAPEINISLDQ
6 huKIAA0367 (N-term. end cut off!)EDVGMDIPF EEGV-LSPSAADMRP EPPNSLDLNDTHPRR IKLTAPNINLSLDQ
7 mu0367homo (N-term. end cut off!)    MDIHF EEGV-LSPSAADMRP EPPNSLDLNGSHPRR IKLTAPNINLSLDQ
4 BNIP2      ---------MEGVEL KEEWQDEDFPIPLPE DDSIEADILAITGPE DQPGSLEVN-GNKVR KKLMAPDISLTLDP
8 Bnip2      ---------MEGVEL KEEWQDEDFPIPLPE DDSIEADTLDGTDPD RQPGSLEVN-GNKVR KKLMAPDISLTLDP
9 DrosCG11593  (N-term. end cut off - only C-terminal end aligned)

             91        105 106       120 121       135 136       150 151       165
1 ATCAY      LDINVDDIETPDETD SLEFLGNGNELEWED DTPVATAKNMPGDSA DLFGDGTTEDGSAAN GRLWRTVIIGEQEH
2 ATCAY(Maca)LDINVDDIETPDETD SLEFLGNGNELEWGD DTPVATAKNMPGDSA DLFGDGTTEDGGAAN GRLWRTVIIGEQEH
3 Atcay      LDINVDDIETPDETD SLEFLGNGNELEWED DTPVATAKNMPGDSA DLFGDGSAEDGSAAN GRLWRTVIIGEQEH
6 huKIAA0367 IDINVDELDTPDEAD SFEYTGH------ED --PTAN-KDSGQESE SIPEYTAEEER--ED NRLWRTVVIGEQEQ
7 mu0367homo IDINVDELDTPDEAD SFEYTNH------ED --PTAN-KSSGQESE SIPEYTAEEER--ED NRLWRTVVIGEQEQ
4 BNIP2      GEIDLDGLDTPSE-- ------NSNEEFEWED DLPKPKTTEVIRKG- SITEYTAAEEK--ED GRRWRMFRIGEQDH
8 Bnip2      GEVDLEGLDTPSE-- ------NSDEFEWED DLPKPKTTEVIRKG- SITEYTATEEK--GD GRRWRMFRIGEQDH
9 DrosCG11593 (N-term. end cut off - only C-terminal end aligned)YTAAEERR--D SRNWQKITLPDGRI

             181       195 196       210 211       225 226       240 241       25
1 ATCAY      GGYYGEGLNAIIVFA ACFLPDSSLPDYHYI MENLFLYVISSLELL VAEDYMIVYLNGATP RRRMPGIGWLKKCY
2 ATCAY(Maca)GGYYGEGLNAIIVFA ACFLPDSSLPDYHYI MENLFLYVISSLELL VAEDYMIVYLNGATP RRRMPGIGWLKKCY
3 Atcay      GGYYGEGLNAIIVFA ACFLPDSSSPDYHYI MENLFLYVISSLELL VAEDYMIVYLNGATP RRRMPGIGWLKKCY
6 huKIAA0367 GGYYGDGLNAIIVFA ACFLPDSSRADYHYV MENLFLYVISTLELM VAEDYMIVYLNGATP RRRMPGLGWMKKCY
7 mu0367homo GGYYGDGLNAIIVFA ACFLPDSSRADYHYV MENLFLYVISTLELM VAEDYMIVYLNGATP RRKMPGLGWMKKCY
4 BNIP2      GGYYGDGLNAIVVFA VCFMPESSQPNYRYL MDNLFKYVIGTLELL VAENYMIVYLNGATT RRKMPSLGWLRKCY
8 Bnip2      GGYYGDGLNAIVVFA VCFMPESGQPNYRYL MDNLFKYVIGTLELL VAENYMIIYLNGATT RRKMPSLGWLRRCY
9 DrosCG11593GGY  GGQNAIVIFC ACHLPDRSRARYSYV MDNLFLYVVKTLEQL VTDDYVLIYLHGGSN RRNVPPFPWLKRCY
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Sec14/CRALTRIO domain

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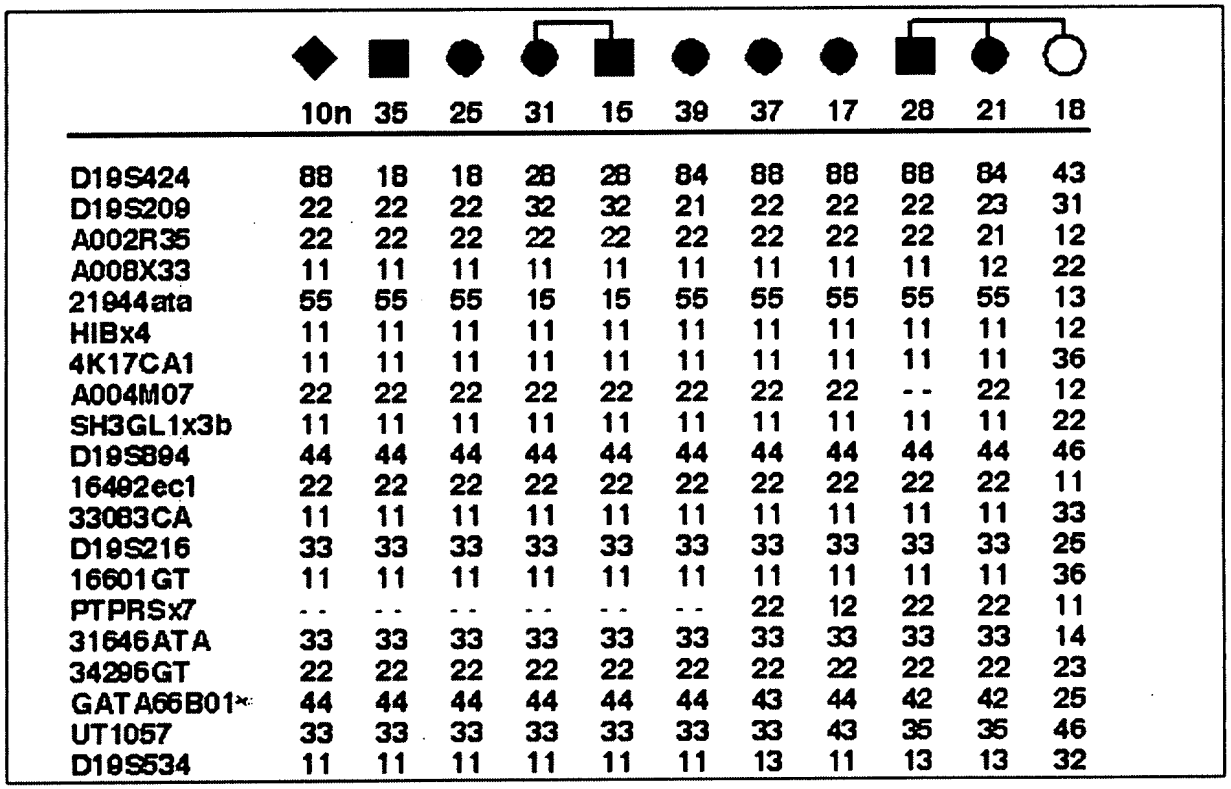
2 ATCAY(Maca)VHPSWFIRTVLAISR PFISVKFINKIQYVH SLEDLEQLIPMEHVQ IPDCVLQYEEERLKA RRESARP-QPEFVM
3 Atcay      VHPSWFIRTVLAISR PFISVKFISKIQYVH SLEELERLIPMEHVQ LPDCVLQYEEQRLRA KRESTRPPQPEFLL
6 huKIAA0367 VHPSWFIRTILAVTR PFISSKFSSKIKYVN SLSELSGLIPMDCIH IPESIIKLDEELREA SEAAKTSCLYNDPE
7 mu0367homo VHPSWFIRTILAVTR PFISSKFSSKIKYVT SLSELSGLIPMDCIH IPESIIKLDEELREA SEAAKTSCLYNDPE
4 BNIP2      VHPSWFIRTLLAVTR PFISSKFSQKIRYVF NLAELAELVPMEYVG IPEC-IKQVQELNGK ---QDE--------
8 Bnip2      VHPSWFIRTLLAVTR PFISSKFSQKIRYVF NLAELAELVPMEYVG IPEC-IKQYEEEKPK KRVDQEPLNGKQEP
9 DrosCG11593VHPTPWIKSLVWMAR PFVSTKFWRKLVYVK SLEELGMHVVVEKAA IPEKVKQYD--AKRH
             361       375
1 ATCAY      ALVSEDQETSMS    human 19p13.3
2 ATCAY(Maca)APVTEDQETSMS    - -
3 Atcay      AEATEDQETSMS    mouse 10
6 huKIAA0367 ------------    human  9q21
7 mu0367homo ------------    mouse 19 - 66 Mb
4 BNIP2      ------------    human 15q22
8 Bnip2      ------------    mouse 9 - 70 Mb
```

Figure 13

Figure 14

Genotypes



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D19S424	88	18	18	28	28	84	88	88	88	84	43
D19S209	22	22	22	32	32	21	22	22	22	23	31
A002R35	22	22	22	22	22	22	22	22	22	21	12
A008X33	11	11	11	11	11	11	11	11	11	12	22
21944ata	55	55	55	15	15	55	55	55	55	55	13
HIBx4	11	11	11	11	11	11	11	11	11	11	12
4K17CA1	11	11	11	11	11	11	11	11	11	11	36
A004M07	22	22	22	22	22	22	22	22	- -	22	12
SH3GL1x3b	11	11	11	11	11	11	11	11	11	11	22
D19S894	44	44	44	44	44	44	44	44	44	44	46
16492ec1	22	22	22	22	22	22	22	22	22	22	11
33083CA	11	11	11	11	11	11	11	11	11	11	33
D19S216	33	33	33	33	33	33	33	33	33	33	25
16601GT	11	11	11	11	11	11	11	11	11	11	36
PTPRSx7	- -	- -	- -	- -	- -	- -	22	12	22	22	11
31646ATA	33	33	33	33	33	33	33	33	33	33	14
34296GT	22	22	22	22	22	22	22	22	22	22	23
GATA66B01*	44	44	44	44	44	44	43	44	42	42	25
UT1057	33	33	33	33	33	33	33	43	35	35	46
D19S534	11	11	11	11	11	11	13	11	13	13	32

Figure 15

Table 2

Marker	Forward	Reverse	Alleles	Size
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4k17ca	tgtgttcacctactacctac	aaagaccaaagtctggcag	6	225
31646ata	aaatgcatcctgctgccttc	gatccaatgtgacatgccac	4	210
16601gt	caccagtgcagagaatcctt	tctctgggctgtgtgagagc	6	189
33083ca	atgacaagcactccagcctga	agcttgcagtgagccgagat	3	206
16492ec1	gccgtttgacgtgcattgtt	agcaatatccgctcttcctg	2	187
PTPRSX7	gactcctagttgtctccct	cacacatagggacaaagag	2	266
A008X33	agacagagtaagacaaaaacacc	gatttgagaagatgtcagttt	2	160
A002R35	tggcttattttctcatc	cacttgtgctgagactct	2	232
HIBx4	gcacgaaaacagactaatacgg	gttgcatttcagacctctcc	2	185
XRRC1ca1	ccgatggatctacagttgca	tcttggatgagaaccaactc	6	159
ERRC1ca2	ttacaggagtgagccaccat	aggactcacaagtggttg	7	215
ERRC2ca6	ttgtactcactgtgtgccag	tagtaagccaagatcactccc	4	244
79129ca	ttagaagcccgtgttggaac	ctgtgatttgtggagtgtgg	7	207
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282485ca4	agccctaatactcgcttctg	gcaggttgcagaataccttg	3	186
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